

## FY 1975 RDT&E DESCRIPTIVE SUMMARY

Program Element # 35158F

Title Satellite Data System

Category Intelligence and Communications

Budget Activity #4 - Military Astronautics and Related Equipment

BACKGROUND AND DESCRIPTION: The Satellite Data System (SDS) is designed to provide critical transpolar, two-way, real-time command, control and communications for Strategic Air Command Single Integrated Operational Plan (SIOP) forces. Since a synchronous equatorial orbit cannot provide communications coverage over the polar regions above 70 degrees North Latitude, a highly inclined elliptical orbit was selected to provide . The SDS is an integral part of the Air Force Satellite Communications (AFSATCOM) system which includes the Air Force Ultra High Frequency (UHF) communications capability on the synchronous equatorial Fleet Satellite Communications (FLTSATCOM) system, piggy-back transponders on selected host satellites, and airborne/ground radio terminals. As such, the SDS will complement the FLTSATCOM system by providing the requisite polar UHF capability. Additionally, the SDS will support the Air Force Satellite Control Facility (AFSCF) requirement for reliable two-way high data rate, S-Band communications between the AFSCF remote tracking station at Thule, Greenland and the CONUS. The direct benefits derived from the SDS communications capabilities will be the reliable and secure direct communications linkage over the polar regions to provide greatly improved command and control of SIOP forces and eliminate the dependence on vulnerable undersea cables to the Thule station.

RELATED ACTIVITIES: The Space segment of the FLTSATCOM will be developed, procured and launched under FLTSATCOM Program Element (PE) 33109N. The Air Force aircraft and ground UHF radio terminals required for operation with the FLTSATCOM and SDS satellites will be procured within the Air Force Satellite Communications System (AFSATCOM), PE 33601F. The AFSCF stations are funded under the AFSCF Program Element, PE 35110F.

WORK PERFORMED BY: Headquarters, Air Force Systems Command, Space and Missile Systems Organization (SAMSO), Los Angeles, California, is responsible for the Satellite Data System. The primary contractor is Hughes Aircraft Company, El Segundo, California. General Systems Engineering and Technical Direction (GSE/TD) is performed by The Aerospace Corporation, El Segundo, California.

### PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 1973 and Prior Accomplishments: The technology phase of the program was completed in FY 1971. This was followed by a contract definition phase in FY 1972 which established the system configuration. The system acquisition contractor was selected by competitive source selection and a system development contract was awarded in June 1972. The system preliminary design review (PDR) was successfully completed in March of 1973 with all critical specifications being met or exceeded. Fabrication of communications subsystem engineering models was begun during FY 1973.

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2. FY 1974 Program: The initial flight vehicle is being procured incrementally with RDT&E funds. A production option to the development contract was exercised beginning in FY 1974. This option provides for the fabrication, assembly, and test of the first production model spacecraft. The development and production schedules are phased to achieve the required delivery, launch and system operational dates.

The key to this phased schedule is that subsystem lead-time is essential to achieve an orderly spacecraft production flow. Critical development and qualification activity is completed before subsystem/system fabrication and assembly is begun and all development activity is completed before production is started at each critical stage. The communications subsystem engineering models were completed by November 1973 and testing was started. System critical design review (CDR) is scheduled for the third quarter FY 1974. Fabrication of the structural model spacecraft was started along with development and fabrication of spacecraft qualification subsystems and test equipment. Structural model tests will begin in the third quarter followed by subsystem qualification and qualification model spacecraft buildup. Development of spacecraft telemetry and command software will be continued.

3. FY 1975 Planned Program: Subsystem and system level qualification testing will be completed during this period to fully validate the system design. As key subsystem qualification tests are successfully completed; fabrication, assembly and tests of flight subsystems will be started. This phased development and production schedule will continue in preparation for flight spacecraft assembly and test. Launch vehicle integration engineering and spacecraft software development will be continued during this fiscal year.

4. Program to Completion: This is a continuing program. As an integral part of the AFSATCOM system, the program will continue to provide critical communications coverage and be totally compatible with the AFSATCOM aircraft and ground radio terminals.

sustaining engineering support will be required to maintain design compatibility and incorporate improvements for survivability, reliability, and capability and provide replenishment spacecraft

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5. <u>Milestones:</u>	<u>Date</u>	Estimated Cumulative RDT&E
		Cost to Reach Milestones (\$ in Millions)
a. Systems PDR	Mar 1973	49.6
b. Systems CDR	Mar 1974	96.6
c. First Article Config. Insp.		
d. Launch First Spacecraft		
e. Launch Second Spacecraft		
f. Full Operational Capability		

RESOURCES: (\$ in Millions)

	<u>FY 1973</u>	<u>FY 1974</u>	<u>FY 1975</u>	<u>Additional to Completion</u>	<u>Total Estimated Cost</u>
RDT&E: Funds (3600)	23.0	41.9	36.5	Continuing	Not Applicable
*Quantities					
Flight Model Spacecraft					1
T-IIIB/Agena Launch Vehicles					1

\*These quantities will be procured over the lifetime of the program.

Procurement:

Funds (3020)	0	35.0	35.8	Continuing	Not Applicable
Quantities					
Flight Model Spacecraft					3**
T-IIIB/Agena Launch Vehicles					3**

\*\*The Qualification Spacecraft will be refurbished and used as a backup flight spare.